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SCIENCE

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CONTENTS

<i>The New York Section of the American Chemical Society:—</i>	
<i>Introductory Address by the Chairman:</i>	
DR. L. H. BAEKELAND	817
<i>The Warfare of the Future:</i> HUDSON MAXIM	820
<i>Public Lectures on Medical Subjects at the Harvard Medical School</i>	831
<i>The Sarah Berliner Research Fellowship ...</i>	832
<i>The International Association of Medical Museums</i>	832
<i>Sectional Meetings of the American Association for the Advancement of Science.....</i>	833
<i>The Annual Dues of Members of the American Association for the Advancement of Science: DR. L. O. HOWARD</i>	834
<i>Scientific Notes and News</i>	834
<i>University and Educational News</i>	837
<i>Discussion and Correspondence:—</i>	
<i>An Electric Storm on the Washakie Needles: OWEN WISTER. A Notable Cloud Banner: B. M. VARNEY. The Training of Industrial Chemists: PROFESSOR J. BISHOP TINGLE. The Tariff and Scientific Books: DR. R. P. BIGELOW</i>	837
<i>Scientific Books:—</i>	
<i>Ward on Climate: O. L. F. Rust's Ex-Meridian Tables: G. W. LITTLEHALES. Groth's Chemische Krystallographie: PROFESSOR EDWARD H. KRAUS. Sabin's House-Painting and Maire's Modern Pigments: PROFESSOR A. H. GILL. Tyler's Man in the Light of Evolution: PROFESSOR H. W. CONN</i>	841
<i>Special Articles:—</i>	
<i>Recent Discoveries in the History of the Common Eel: DR. THEO. GILL</i>	845
<i>The Astronomical and Astrophysical Society of America: PROFESSOR HAROLD JACOBY and F. H. SEARS.....</i>	846
<i>The Convocation Week Meetings of Scientific Societies</i>	855

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NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY INTRODUCTORY ADDRESS BY THE CHAIRMAN¹

IN opening this session of our society, and as an introduction to the subject of this evening's program, I dare take the risk of making a few general remarks.

Our meetings have for object not only to bring before members facts and ideas, but more specially to provoke discussions. I consider a paper without a discussion as an unfinished program, and I sincerely hope that the subject of to-night will lead to a lively exchange of ideas.

For us, if we are worthy of the name of chemists, our God means Truth; and nothing helps so much to correct our views and to arrive at the truth as an honest discussion: "Du choc des idées jaillit la lumière."

I believe that in our meetings we can go beyond the dictates of cold, boresome, uninteresting formality. There is no department of science more closely interwoven with the welfare of humanity than our field of chemistry; indeed many branches of chemistry have a very direct bearing on economics and sociology.

Every speaker who appears before us has the right to treat his subject in accordance with his own sincere convictions. Anybody who speaks about explosives is naturally led to talk of their uses for defensive and aggressive purposes. To deny a speaker this privilege would be as

¹ Delivered at the Chemists' Club in New York City, October 9.

unliberal as to forbid him to talk about alcoholic-fermentation industries because the Prohibition Party thinks alcohol ought not to exist; it would be as if a paper on the uses of saccharine was objected to by the Pure Food Law advocates or as if a discussion on the therapeutic value of chemicals was distasteful to the followers of Mrs. Eddy; it would be as unwarranted as if, in a geological society, a paper was considered as objectionable because it contained statements contrary to the text of the Bible.

The chemistry of explosives has always been narrowly connected with the so-called art of war, and it is almost impossible to talk broadly on one subject, without touching upon the other.

I admit, I consider this a very unfortunate attitude of mind, a sign of the yet very incomplete development of the human race; yet, to the average man, this attitude is predominant. For too many generations our race has been perverted by a pernicious education where writers and artists have glorified and misrepresented war. We are all laboring under the harm which has been done by the so-called classic writers of antiquity whom I shall take the liberty of calling here the "braggarts" of antiquity, for they it were who, in their bombastic rhyme and prose, made so much out of a little scrimmage between a handful of excited fighters, as to make it appear as a feat worthy of the gods. As long as the plastic little brains of our children are influenced by this class of literature, so long will explosives and war go together. Men like Grant, Sherman, Tolstoi, Verestschagin, men who have participated in the horrors of war, do not talk nor write, nor paint the glorification of war.

If I kill a man and take what he has and what he was not willing to give me,

you will call it murder and theft, but if some people kill and rob under association rules, they will call it war and conquest. There was a time when agriculture, industry and commerce were considered of very scant importance, because it was so much easier to get rich by conquering other nations and return triumphantly home, laden with plunder and stained with blood, but greeted with the applause of young and old. The Romans and the Greeks and even the armies of Napoleon knew very well how to play this game successfully. I am glad to say that since those times we have made some little progress. Wars are no longer remunerative except to army contractors and newspapers. Statistics show that nowadays it costs every warring nation about one million a day to keep an army in the field. Even then the results for the victor are about as disastrous as in a successful patent lawsuit where patentee and infringer both lose money after they have paid for attorneys and chemical experts. The financial crisis in Germany after the Franco-Prussian war, the present poverty of Japan after two successful wars, are striking instances of all this.

Nowadays people who want to get very rich have surer ways than those of plunder by war: law-makers and lawyers have given them easier opportunities for plundering their fellow-men by the skillful use of so-called "business methods" and so-called "honesty" as defined by law. Sure enough, in the midst of all this live some dreamers who in their visions of the future behold the disappearance of war. I admit I count myself amongst these visionaries, these cranks, these unorthodox, unrespectable people, although I fear that our dreams are still far from complete realization. Nevertheless, the fact that some people dare dream such dreams and

dare dream them in public is already a very hopeful sign. There was a time when even the most radical philosophers of Greece could not conceive a nation without chattel slaves and it is not so long ago that the question of slavery whenever touched upon in this country brought forth ridicule and violent opposition.

The people of the United States by putting in their waste baskets the old solemn formula of the "Divine Right of Kings" have done much to abolish war. But this country did more by showing to other nations that a great, happy, prosperous commonwealth can be built up quicker and surer by the power of higher ideals and of honest work than by war and conquest.

It is a current idea that to be prepared for war is to avert war. This may be quite true, but the main question remains to determine what you call "being prepared for war." I very much believe that if we had had no navy we should never had had a war with Spain and we should not now be burdened with a "Philippine Problem."

Let me remind you of the fact that there are \$180,000,000 invested in our fleet that is now in the Pacific which costs the people of this republic a sum of money which would irrigate permanently 6,000,000 acres of arid land and transform it forever into a bountiful, rich agricultural district that would provide permanent, prosperous homes for 120,000 families of good, self-respecting, independent citizens. It would build 60 to 100 great electric power plants. It would utilize some of the natural resources of this country, make them available for transportation, light, heat and power to all citizens of this republic instead of leaving them to be exploited for private gain.

Every battleship which now goes to the junk pile after a few years of parading, costs a sum of money which would enable

us to build, equip and endow every time, a splendid university or technical school that would rank with the very best of the world's institutions and the benefits of which would be increasing and everlasting.

Yet I know there are many among my friends who believe that the surest way to avert war is to make it so horrible that nobody dares to engage in it. If the conservative military class had been left to themselves they probably would still be fighting with bows and arrows, but scientists and inventors have been encouraged to give them their support. Whenever a new invention appears, the question is raised immediately, How can it be used in war? Napoleon's interest in Fulton's ship was exclusively inspired by the possibility of using steamships in his war with England. Even nowadays balloons and flying machines receive their main encouragement from those who concentrate their attention on war and its engines.

Let me tell you that this attitude of mind is practically the same as if every time our friend, Professor Bogert, discovers a new synthetic product with a never-ending name, somebody would come around and pay him to make a ripping and killing poison out of it.

The intervention of science and engineering has not only made war more horrible than before, but has shorn away its picturesqueness which used to inspire the Don Quixotes whenever worms killed other worms. Furthermore, the gods of war no longer are influenced by the offerings or sacrifices or clamoring prayers of long-robed priests. They do not even take into consideration the so-called righteousness of the cause. On the other hand, they seem to have become very decidedly partial to the nation whose artillerists do not forget their logarithms during the heat of battle or whose explosives are best nitrated. In-

stead of the bards of olden times who were paid by the war-lords to sing their praise and to tell lies in prose and in rhyme, we now have the modern newspaper. But even if some newspapers are glad to have a war on hand which increases their circulation, they can no longer arouse enthusiasm since their war reporters with their deadly kodaks take away all the bombast from their descriptions and only picture stern, prosaic, nasty reality.

Fortunately for us the study of explosives and engines of war has a broader interest. In the same way as the deadliest of poisons have become some of the most valuable therapeutic agents, so have explosives and engines of war found their most valuable applications in the arts of peace. Nitro-cellulose or gun-cotton, one of the most violent explosives, found immediately its applications in surgery, later on in the manufacture of celluloid and also made possible the photographic film. Shall I call your attention to the splendid example of our fellow chemist, Nobel, who with his valuable work on nitro-glycerine, dynamite and similar explosives, has made his discoveries and inventions incomparably more useful in mining and in engineering than in war, and thus created more good than the harm they ever will do in the art of killing. Noble, too, was one of those who did not love war, and he showed it when, after his useful life, he made of his enormous but well-acquired fortune an international bequest for furthering peace and civilization.

Shall I remind you of the time when chemistry did not exist, when the only encouragement which was given to experimental research was dictated by greed, that tried to make gold and thus bribed the skill of the alchemist? And yet what an immense amount of knowledge was thus accumulated! Knowledge which was

afterwards utilized for the benefit of mankind.

Let me remind you also, my friends and fellow chemists, that our God-given mission is to utilize our science for the welfare of our whole race; to develop and improve our knowledge, our thoughts, our aspirations, to lead to a better, a higher, a happier race; a race where individual selfishness and conceit shall not count a life by three score and ten, but a race where an individual and a nation are only considered as temporary cells or groups of cells in an everlasting organism that lives through centuries and æons; and which shall keep on improving and improving towards higher and higher standards; unless ignorance, greed and selfishness make it unhappier and unhappier, until finally it finds a fitful and merciful annihilation and perishes and follows the way of the dead races of animals and plants that have only left their traces on past geological periods, and now proclaim to us that they were not apt, not fit, not warranted to perpetuate themselves.

Gentlemen: I now have the pleasure of introducing to you our distinguished fellow chemist, Mr. Hudson Maxim, an American, who by his discoveries, his inventions, by his originality of thought and action, has shown over and over again that he is most eminently qualified to treat the subject of this evening.

L. H. BAEKELAND

THE WARFARE OF THE FUTURE¹

How will the battles of the future be fought? In our reasoning we are obliged to proceed from the simple to the complex, from what we know to what we would

¹Address before the New York Section of the American Chemical Society at the rooms of the Chemists' Club, 108 West 55th Street, on Friday evening, October 9, 1908.